

WHAT IS CLAIMED IS:

- 1 1. A method for eliciting an immune response, the method comprising
2 retroductally introducing into the lumen of a salivary gland duct of a subject an
3 immunogenically effective amount of a composition comprising a nucleic acid encoding an
4 immunogenic polypeptide, whereby an immune response is generated.
- 1 2. The method of claim 1, wherein the step of delivering is by
2 cannulation.
- 1 3. The method of claim 1, wherein the composition further comprises an
2 adjuvant.
- 1 4. The method of claim 3, wherein the adjuvant is a cholera toxin.
- 1 5. The method of claim 3, wherein the adjuvant is Al(OH)₃.
- 1 6. The method of claim 3, wherein the adjuvant is a lipid.
- 1 7. The method of claim 3, wherein the adjuvant is a polyionic organic
2 acid.
- 1 8. The method of claim 7, wherein the polyionic organic acid is 6,6'-
2 [3,3'-demethyl[1,1'-biphenyl]-4,4'-diyl]bis(azo)bis[4-amino-5-hydroxy-1,3-naphthalene-
3 disulfonic acid].
- 1 9. The method of claim 1, wherein the composition is administered
2 multiple times.
- 1 10. The method of claim 1, wherein the nucleic acid is operably linked to
2 an expression control sequence.
- 1 11. The method of claim 1, wherein the nucleic acid is in a viral vector.
- 1 12. The method of claim 1, wherein the immunogenic polypeptide is a
2 cancer antigen.
- 1 13. The method of claim 1, wherein the immunogenic polypeptide is a
2 viral antigen.

- 1 14. The method of claim 13, wherein the viral antigen is HIV envelope
2 protein or a portion thereof.
- 1 15. The method of claim 1, wherein the immunogenic polypeptide is a
2 bacterial antigen.
- 1 16. The method of claim 15, wherein the bacterial antigen is anthrax
2 protective antigen.
- 1 17. The method of claim 3, wherein the composition further comprises a
2 lipid, whereby the lipid facilitates uptake of the nucleic acid by antigen presenting cells.
- 1 18. The method of claim 17, wherein the lipid is N,N,N',N'-tetramethyl-
2 N,N'-bis(2-hydroxyethyl)-2-3-di(oleoyloxy)-1,4-butanediammonium iodide.
- 1 19. The method of claim 1, wherein the salivary gland is a submandibular
2 salivary gland.
- 1 20. The method of claim 1, wherein the salivary gland is a parotid salivary
2 gland.
- 1 21 . The method of claim 1, wherein the salivary gland is a sublingual
2 salivary gland.
- 1 22. The method of claim 1, wherein the subject is a mammal.
- 1 23. The method of claim 22, wherein the mammal is a primate.
- 1 24. The method of claim 23, wherein the primate is a human.
- 1 25. The method of claim 1, wherein the immune response comprises a
2 mucosal immune response.
- 1 26. A method for transfecting antigen presenting cells, the method
2 comprising retroductally introducing into the lumen of a salivary gland duct of a subject an
3 immunogenically effective amount of a composition comprising a nucleic acid encoding an
4 immunogenic polypeptide, whereby an antigen presenting cell is transfected with the nucleic
5 acid.

- 1 27. The method of claim 26, wherein the step of delivering is by
2 cannulation.
- 1 28. The method of claim 26, wherein the composition is administered
2 multiple times.
- 1 29. The method of claim 26, wherein the nucleic acid is operably linked to
2 an expression control sequence.
- 1 30. The method of claim 29, wherein the nucleic acid is in a viral vector.
- 1 31. The method of claim 26, wherein the immunogenic polypeptide is a
2 cancer antigen.
- 1 32. The method of claim 26, wherein the immunogenic polypeptide is a
2 viral antigen.
- 1 33. The method of claim 32, wherein the viral antigen is HIV envelope
2 protein or a portion thereof.
- 1 34. The method of claim 26, wherein the immunogenic polypeptide is a
2 bacterial antigen.
- 1 35. The method of claim 34, wherein the bacterial antigen is anthrax
2 protective antigen.
- 1 36. The method of claim 26, wherein the composition further comprises a
2 lipid, whereby the lipid facilitates uptake of the nucleic acid by the antigen presenting cells.
- 1 37. The method of claim 26, wherein the salivary gland is a submandibular
2 salivary gland.
- 1 38. The method of claim 26, wherein the salivary gland is a parotid
2 salivary gland.
- 1 39. The method of claim 1, wherein the salivary gland is a sublingual
2 salivary gland.

- 1 40. The method of claim 26, wherein the subject is a mammal.
- 1 41. The method of claim 40, wherein the mammal is a primate.
- 1 42. The method of claim 41, wherein the primate is a human.
- 1 43. The method of claim 26, wherein the antigen presenting cells in a
2 proximal lymph node are transformed by the nucleic acid.
- 1 44. The method of claim 43, where in the antigen presenting cells are
2 dendritic cells.
- 1 45. The method of claim 43, wherein the proximal lymph node is a
2 draining lymph node.
- 1 46. The method of claim 43, wherein the draining lymph node is a
2 submandibular lymph node.
- 1 47. The method of claim 43, wherein the draining lymph node is a parotid
2 lymph node.
- 1 48. The method of claim 43, wherein the draining lymph node is a cervical
2 lymph node.
- 1 49. The method of claim 26, wherein the antigen presenting cells in a
2 salivary gland are transformed by the nucleic acid.
- 1 50. A pharmaceutical composition, the composition comprising:
2 a nucleic acid encoding an immunogenic polypeptide;
3 a lipid; and
4 a transition metal enhancer.
- 1 51. The composition of claim 50, wherein the lipid is N,N,N',N'-
2 tetramethyl-N,N'-bis(2-hydroxyethyl)-2-3-di(oleoyloxy)-1,4-butanediammonium iodide and
3 the transition metal enhancer is ZnCl₂.